

# Muhammad Akhtar Munir

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**LinkedIn, Google Scholar**

## Summary

A self-motivated Ph.D. research fellow with wide background of computer science, research, and development. Hands on experience in developing algorithms and designing experiments for practical problems in computer vision and deep learning. Current research focuses on deep learning, domain adaptation, and object detection.

## Areas of Interest

Computer Science, Computer Vision, Deep Learning, Object Detection, Domain Adaptation

## Experience

- **Ph.D. Fellow** (Full Scholarship) at Information Technology University (ITU) of Punjab, Lahore, Pakistan.
  - **Duration:** September 5, 2017 – Present
  - **Association:** Intelligent Machines Lab, Department of Computer Science, ITU
  - **Ph.D. Advisor:** Dr. Mohsen Ali
- **Lab Engineer** at School of Electrical Engineering and Computer Science (SEECS), NUST, Islamabad, Pakistan.
  - **Duration:** November 26, 2013 – September 4, 2017
  - **Association:** Department of Computing, SEECS, NUST

## Education

Sep'17- Present	Doctor of Philosophy in Computer Science <b>CGPA: 3.50/4.0</b> (Coursework)	<b>Information Technology University, Lahore</b>
	<i>Courses:</i> Deep Learning, Computer Vision, Machine Learning, Pattern Recognition, Probability & Stats	<i>Thesis (in Progress):</i> Domain Adaptation for Object Detection
Feb'15- Jun'17	Master of Science in Computer Science <b>CGPA: 3.84/4.0</b>	<b>COMSATS Institute of Information Technology, Islamabad</b>
	<i>Courses:</i> Artificial Intelligence, Digital Image Processing, Algorithms Analysis	<i>Thesis:</i> Ischemic Stroke Lesion Segmentation in MR Sequences Using MLP and SVM
Feb'09- Jan'13	Bachelor of Science in Computer Engineering <b>CGPA: 3.38/4.0</b>	<b>COMSATS Institute of Information Technology, Islamabad</b>

## Publications

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Javed Iqbal, **Muhammad Akhtar Munir**, Arif Mahmood, Afsheen Rafaqat Ali, and Mohsen Ali. "Leveraging Orientation for Weakly Supervised Object Detection with Application to Firearm Localization." *(Neurocomputing 2021, IF=4.438)*

Abdul Basit, **Muhammad Akhtar Munir**, Mohsen Ali, Naoufel Werghi, and Arif Mahmood. "Localizing Firearm Carriers By Identifying Human-Object Pairs." In *2020 IEEE International Conference on Image Processing (ICIP)*, pp. 2031-2035. IEEE, 2020.

Asad Javed, Muhammad Fasihullah, **Muhammad Akhtar Munir**, Imran Usman, M. Farhan Shafique, Tariq Bashir, and Mehmood Ashraf Khan. "A new additive watermarking technique for multimodal biometric identification." *Journal of Basic and Applied Scientific Research* 3, no. 7 (2013): 935-942.

## Research/Projects

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**Domain Adaptation:** I have been doing research related to Domain Adaptation for Object Detection. My objective is to design the algorithm that effectively solves the problems of domain gap, where data distribution is different across the domain (source & target). Specifically, I am doing research in Unsupervised Domain Adaptation (source: labelled & target: unlabeled), exploring self-training and adversarial-learning based methods.

**Human Firearm Interaction Detection:** I have been working on Human Object Interaction problems, leveraging firearm as object. Localizing objects in the complex scenario and associate it with right candidate (human) is a widely studied problem. We explore the attention-based methods to overcome the challenges of cluttered environment where object interaction could be wrongly associated to human.

**Firearm Detection:** I have worked on weakly supervised object detection with application to firearms. Without using oriented bounding box, our proposed method predicts oriented bounding boxes. We use axis aligned boxes and angle information (easy to annotate than oriented bounding boxes) in our pipeline, and we are able to mitigate background noise in axis aligned boxes with the knowledge of orientation.

**Medical Image Analysis:** As a semester project, we aim to predict the blindness indirectly using retinal layers images with choroidal neovascular and diabetic macular edema categories. As a third category, drusen is for vision weakness and finally, normal category is for observation sample. This prediction of blindness helps for anti vascular endothelial growth factor treatment, that stops the retinal disease and make eye vision properly working.

## Programming Languages & Tools

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- Python
- Deep Learning Frameworks  
(PyTorch, Keras, Caffe)
- C/C++
- MATLAB
- Linux
- Visual Studio Code
- Microsoft Visual Studio
- Microsoft Office
- Latex

## Key Skills

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- Research & Development
- Teamwork
- Proposal Writing
- Communication

## MOOC

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- Generative Adversarial Networks (GANs): [CERTIFICATE](#) (Specialization) DeepLearning.AI  
Taught by: Sharon Zhou (Stanford University)
  - Course1: Build Basic Generative Adversarial Networks (GANs)
  - Course2: Build Better Generative Adversarial Networks (GANs)
  - Course3: Apply Generative Adversarial Networks (GANs)

## Services (as Reviewer)

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- ACM Multimedia 2021 Conference